REMARKS

Reconsideration of this application, as amended, is respectfully requested. By this Amendment, claims 1, 3 & 7 have been amended to more particular point out and distinctly claim the subject invention. Claims 1-16 remain in this application.

In the last Office Action, claims 1-16 were rejected under 35 U.S.C. §102(b) as allegedly anticipated by WO 00/07863, of which Hiberer (U.S. Patent No. 6,540,308) is the English equivalent. This rejection, to the extent that it may be deemed applicable to the claims as now presented, is respectfully, but most strenuously traversed.

Industrial vehicles customarily have a parking brake system which allows the vehicle to be immobilized when it is at rest, by mechanically locking the wheels. This parking brake is released by an actuator when the actuator is supplied with compressed air at an appropriate pressure. On existing vehicles, an air treatment device situated at the outlet side of the pneumatic compressor delivers a supply pressure which is conveyed, via dedicated lines, up near to the actuators used to release the parking brake.

More specifically, these lines supply pneumatic components, such as cocks and valves in particular, which deliver a suitable control pressure to the actuator. These cocks are generally operated manually by the driver. Thus, the air treatment device situated on the outlet side of the compressor delivers a supply pressure which is then remotely and selectively varied by the cocks and valves to suitably actuate the actuator of the parking brake system.

In the present invention, a unitary air treatment device, positioned on an outlet side of a compressed-air source, includes:

- a supplementary air outlet for directly providing compressed air at a variable control pressure to an actuator or actuators of a parking brake system of the motor vehicle;
- a supplementary set of electro-pneumatic components associated with and upstream of the supplementary air outlet which set receives compressed air at a supply pressure and applies the variable control pressure to the compressed air to selectively fully operate the actuator or actuators; and

- operating means incorporated into the electronic command and control unit, to operate the supplementary set of electro-pneumatic components on the basis of information originating from the computer communication bus and/or from the various electrical components, whereby full operation of the actuator or actuators of the parking brake system is directly controlled by the device rather than by a dispersed pressure control component.

In other words, for the first time, in accordance with the principles of the present invention, the parking brake is operated fully and directly by the air treatment device situated on the outlet side of the compressor, rather than by a dispersed pressure control component. As stated in the original specification (page 4, line 38 – page 5, line 5):

> "Operation of the parking brake is to be understood as meaning not only the supplying of the actuators with compressed air pressure, but also the taking account of specific information that allows or forbids the release of the parking brake, on the basis of numerous items of information originating in particular from the cab of the vehicle."

In the present invention, the various electro-pneumatic components such as electrically operated valves that supply the parking brake actuator are incorporated into the air treatment device situated on the outlet side of the compressor and are no longer, as they were in the prior art, spread throughout the vehicle. Grouped within the same air treatment device of the present invention are the various electro-pneumatic components responsible for releasing the parking brake and the control logic for these components which is incorporated into the command and control unit of the device.

The present invention thus results in improved reliability because there is no longer any need to convey to various points of the vehicle and especially to the cabin, the pneumatic information for operating the valves responsible for the parking brake function. Further, maintenance operations are made easier, as are the possibilities of carrying out automated diagnostics, using overall management of the command and control unit, which operates the parking brake. In the present invention, the claimed air treatment device directly and fully manages and operates the parking brake of the motor vehicle. For example, as illustrated in original Figure 3 of this application, one of the electro-pneumatic modules (16) is dedicated to supplying the control pressure to the parking brake of the motor vehicle. This module (16) delivers a control pressure which acts on an actuator which opposes the application of the

parking brake. It is in the presence of this pressure that the parking brake is released. In other words, when this pressure is absent, the parking brake cannot be released. The control pressure thus delivered by this module (16) is provided by way of an electrically operated valve (27) which is operated on the basis of various information items processed by the command and control unit (10) of the device.

Various processing operations on this information may be carried out according to particular safety modes. Thus, the authorization to release the parking brake may be determined on the basis of the command given by the manipulator actuated by the driver, and a measure of the pressure in the service brake circuit reservoir. This pressure check makes it possible to avoid releasing the parking brake when the service brake is not yet operational, because the pressure in the service braking circuit is not yet sufficient. The command and control unit (10) therefore checks these various conditions and governs the electrically operated valve accordingly.

According to another type of parking brake management system, one particularly in force in the countries of Northern Europe, a check is also made to ensure that the driver is present in the cab before authorizing the release of the parking brake. Detection of the presence of the driver can be done in various ways, either by detecting his presence using a sensor present under his seat, or alternatively by detecting actuation by the driver of a particular pedal or lever. It is by combining these various conditions that the electronic command and control unit governs the electrically operated valve of the module that releases the parking brake.

Other functions may also be performed in relation to the parking brake, by virtue of the incorporation of its control into the air treatment device. This may for example be automatic engagement of the parking brake when the driver switches off the ignition in his cab. It is also possible, for example by using a tilt sensor, to make an automatic transition from the service brake to the parking brake when stopping on a hill, also making use of certain information (vehicle speed, etc.) flowing along the computer communication bus.

In certain types of vehicle, it may prove advantageous to use an actuator associated with certain functions, that can be operated electrically. The application of power to this particular actuator may be achieved by way of an electromechanical or electronic module (17, 18) mounted

on the air treatment device. In this case, the module may in particular contain a relay (38) a contact of which is inserted in the power circuit for this particular actuator. The appropriate control of this relay (38) powers this circuit, when this application of power is authorized bythe electronic command and control unit (10).

A similar arrangement is provided in the air treatment device of the present invention to manage and selectively fully operate the actuator(s) of a pneumatic suspension system (claim 3) or pneumatic actuator(s) of an auxiliary system (claim 7) of the vehicle.

Because all the controls for the various electro-pneumatic components are incorporated into one and the same air treatment device, the supervision of the pneumatic system as a whole is improved, and diagnostic and maintenance operations are made easier. The approach of the present invention affords numerous other advantages including:

1. An improvement in the reliability and a reduction in the air leaks by reducing the number of components and pneumatic connections employed in using the pneumatic power;

2. An improvement in safety associated with the possibility of diagnosing and managing the degraded modes of the pneumatic circuit;

3. An improvement in the options for managing auxiliary functions by virtue of the use of a command and control unit centralized to the air treatment device;

4. A reduction of the cost of the system by virtue of the modular architecture of the air treatment device; and

5. Ease of evolution and of customization of the system to suit a different range of vehicles.

The ELECTRONIC COMPRESSED-AIR PROCESSING SYSTEM of Hilberer neither includes the above-described features nor provides the numerous benefits of the present invention. The compressed-air system of this reference has, "in a housing, an electromechanical pressure regulator, preferably an air dryer cartridge, and a multicircuit safety valve having at least one load circuit connected to it. Each load circuit can be locked separately by means of an assigned pressure control unit". (Column 1, lines 7-12 of Hilberer, emphasis added.)

As illustrated in Figures 1 & 3 of the reference, the multicircuit safely valve M has a plurality of pressure control units, 6, 7, 8, 9 which each provide supply pressure to an assigned supply circuit K1, K2, K3, K4 and FBA. "Circuits K1 and K2 are used for the compressed-air supply of service brake circuits, which are not shown in detail, and comprise, for example, compressed-air storage tanks and other customary components. The parking brake system FBA is connected, for example, to circuit K3, while circuit K4 is provided for the connection of accessories." (Column 6, lines 1-13 of Hilberer, emphasis added.)

The compressed-air processing system of the applied reference is designed and employed to provide compressed air at a supply pressure to the various pneumatic circuits of the vehicle. There is no teaching or suggestion in this reference of using the compressed-air processing system to directly and fully operate the actuator or actuators of the circuits, exclusive of any dispersed pressure control component. In fact, the reference teaches away from the present invention by teaching that the compressed-air processing system is used to "charge" the individual circuits (column 2, lines 46 & 49; column 3, line 4 of Hilberer), and that such circuits include compressed-air storage tanks and "other customary components". (Column 6, line 11 of Hilberer.)

Furthermore, in Figure 3 of the applied reference, the parking brake system FBA is shown connected to a port equipped with a check valve 11. Applicants submit that the presence of this check valve is intrinsic evidence that the compressed-air processing system of Hilberer cannot fully operate the parking brake.

A parking brake is, by law and transport regulations, a brake which must be permanently active except when expressly deactivated. Usually, it is a brake on which a spring acts towards a braking position. To deactivate the brake, it is usually provided with a pneumatic cylinder, that, once applied with pressure, counteracts the action of the spring to push back the brake to a non-braking position. This has the advantage, that, in case of failure of the electronic or of the pneumatic system of the vehicle, the spring will automatically brake the vehicle. Only when the systems are fully operative can air pressure be sent to the pneumatic cylinder to deactivate the park brake.

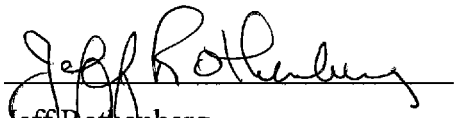
On the other hand, when the driver wants to park his vehicle, he sends an order (for example, by operating a hand brake valve, or by switching an electronic valve) to exhaust the pneumatic cylinder to let the spring push the brake into its parking position. If the compressed-air processing system of the applied reference were capable of achieving full control of the parking brake, it must also achieve the exhaust phase. But this would require, without use of any component outside of the system, that the system contain an integrated exhaust valve. However, this is not possible due to the fact that the check valve would prevent the air from flowing back from the cylinder to any such integrated exhaust valve. Therefore, the presence of the check valve implies that the parking brake system of the applied reference has additional remote pressure control components outside of the compressed-air processing system. Accordingly, the electronic compressed-air processing system of Hilberer is not capable of performing the exact same functions as that of the claimed instant invention.

Also attached is information printed out from the website of KNORR-BREMSE (the Assignee of the Hilberer patent). These documents are believed to relate to the actual implementation of the electronic air control system of this patent. In the drawing labeled Electronic Braking System for Trucks, element 2 is the air processing unit (which, as illustrated, includes an air dryer and a multicircuit safety valve). Note that the pneumatic circuit feeding the parking spring brake 13 includes not only a check valve 15, but also a hand brake valve 16 and a relay valve 17. With the air treatment device of the present invention, these ancillary remotely located pressure control components are avoided.

For all the above reasons, the Examiner is respectfully requested to reconsider and withdraw the prior art rejection.

If it would advance the prosecution of this application, the Examiner is cordially invited to contact Applicant's representative at the below-indicated telephone number.

Respectfully submitted,



Jeff Rothenberg
Reg. No. 26,429
Attorney for Applicant

Dated: August 2, 2006

Heslin Rothenberg Farley & Mesiti P.C.
5 Columbia Circle
Albany, New York 12203
Tel: 518-452-5600
Fax: 518-452-5579
E-mail: jr@hrfmlaw.com

Attachment: "Product Information: Electronic Air Control" and "Electronic Braking System for Trucks" by KNORR-BREMSE